

LETTER TO THE EDITOR

Vascular thromboembolic events following COVID-19 hospital discharge: Incidence and risk factors

We read with interest the retrospective cohort study by Eswaran et al¹ that found a 2.0% incidence of symptomatic thromboembolic events in a cohort of 447 hospitalized patients with coronavirus disease 2019 (COVID-19) within 30 days of discharge. These events encompassed both arterial and venous thromboembolic events (ATEs and VTEs), including four non-ST-segment-elevation myocardial infarctions, three pulmonary emboli, one ischemic stroke, and one splenic infarct. Approximately 42% of patients were discharged on prophylactic anticoagulation, mostly direct oral anticoagulants. Interestingly, the authors described this 2.0% thrombotic incidence as “low.”

The American College of Chest Physicians has previously defined a threshold symptomatic thrombotic risk of 1.0% in control groups to define an “at-VTE” or “moderate-VTE” risk hospitalized medically ill population that would benefit from pharmacologic thromboprophylaxis.² Although it should be acknowledged that the rate of symptomatic pulmonary emboli in the study by Eswaran et al¹ was $\approx 0.7\%$, nearly half of the population had received postdischarge thromboprophylaxis. In addition, applying the criteria used by the authors to define a 2.0% symptomatic thrombotic incidence as “low risk,” no hospitalized medically ill patient—including those with pneumonia and sepsis—would in theory benefit from in-hospital pharmacologic thromboprophylaxis, as the incidence of symptomatic VTE seen in control groups in the early pivotal trials of thromboprophylaxis in hospitalized medically ill patients was $\approx 1.5\%$.³ This would likely apply to hospitalized patients with COVID-19 as well, as the incidence of symptomatic VTE seen in larger cohorts from later studies approached “only” 2.9%.⁴ Finally, there is now good-quality data that indicate that postdischarge thromboprophylaxis reduces the incidence of ATEs (especially stroke) in hospitalized medically ill populations, and that it is worthwhile to combine ATE and VTE rates in hospitalized medically ill patients when assessing thrombotic risk in developing a postdischarge extended thromboprophylactic strategy.⁵

Our group recently presented a large prospective registry of postdischarge thromboembolic and mortality outcomes of 4906 hospitalized patients with COVID-19.⁶ Similar to the findings of Eswaran et al,¹ we found a 90-day rate of VTE of 1.55%, an ATE rate

of 1.71%, and an all-cause mortality rate of 4.83. Receipt of postdischarge anticoagulants, mostly prophylactic-dose direct oral anticoagulants, reduced the risk of major thromboembolism and all-cause mortality by 46%. Nonetheless, unlike the present authors, we did not describe these thrombotic rates as “low risk” but rather “at risk” as supported by antithrombotic guideline thresholds. Minimizing these substantial risks could result in foreclosing opportunities to assess and promote additional or expanded benefits of extended post-hospital discharge thromboprophylaxis in hospitalized patients with COVID-19.

ACKNOWLEDGEMENTS

This work was funded in part by the Broxmeyer Fellowship in Clinical Thrombosis.

RELATIONSHIP DISCLOSURE

ACS is a consultant for Boehringer Ingelheim, Janssen, Bayer, and Portola. All other authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

All authors contributed to the work.

Alex C. Spyropoulos MD^{1,2}  

Dimitrios Giannis MD, MSc¹ 

Mark Goldin MD^{1,2,3}

¹Feinstein Institutes for Medical Research, Northwell Health, Manhasset, NY, USA

²Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Northwell Health, Hempstead, NY, USA

³North Shore University Hospital, Northwell Health, Manhasset, NY, USA

Handling Editor: Mary Cushman

Correspondence

Alex C. Spyropoulos, Zucker School of Medicine at Hofstra/Northwell, The Feinstein Institutes for Medical Research, Department of Medicine, Anticoagulation and Clinical

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *Research and Practice in Thrombosis and Haemostasis* published by Wiley Periodicals LLC on behalf of International Society on Thrombosis and Haemostasis (ISTH).

Thrombosis Services Northwell Health at Lenox Hill
Hospital, 130 E 77th St, New York, NY 10075, USA.
Email: aspyropoul@northwell.edu

ORCID

Alex C. Spyropoulos  <https://orcid.org/0000-0002-3175-461X>

Dimitrios Giannis  <https://orcid.org/0000-0001-9246-976X>

TWITTER

Alex C. Spyropoulos  @AlexSpyropoul

REFERENCES

1. Eswaran H, Jarmul JA, Shaheen AW, et al. Vascular thromboembolic events following COVID-19 hospital discharge: incidence and risk factors. *Res Pract Thromb Haemost*. 2021;5:292-295.
2. Clagett GP, Anderson FA, Geerts W, et al. Prevention of venous thromboembolism. *Chest*. 1998;114:531S-560S.
3. Dentali F, Douketis JD, Gianni M, Lim W, Crowther MA. Meta-analysis: anticoagulant prophylaxis to prevent symptomatic venous thromboembolism in hospitalized medical patients. *Ann Intern Med*. 2007;146:278-288.
4. Cohen SL, Gianos E, Barish MA, et al. Prevalence and predictors of venous thromboembolism or mortality in hospitalized COVID-19 patients. *Thromb Haemost*. 2021. <https://doi.org/10.1055/a-1366-9656>. Online ahead of print.
5. Gibson CM, Chi G, Halaby R, et al. Extended-duration betrixaban reduces the risk of stroke versus standard-dose enoxaparin among hospitalized medically ill patients: an APEX trial substudy (acute medically ill venous thromboembolism prevention with extended duration betrixaban). *Circulation*. 2017;135:648-655.
6. Giannis D, Allen SL, Davidson A, et al. *Thromboembolic Outcomes of Hospitalized COVID-19 Patients in the 90-Day Post-Discharge Period: Early Data from the Northwell CORE-19 Registry*. ASH; 2020. <https://ash.confex.com/ash/2020/webprogram/Paper141901.html>. Accessed April 6, 2021.